

## **4.2 Wildfires**

This section characterizes the wildfire hazard for Benton County.

### **4.2.1 Nature of the Hazard**

Fires are a natural part of the ecosystem in Washington. However, wildfires can present a substantial hazard to life and property in growing communities. Of particular concern are wildfires that ignite on undeveloped lands, and, often aided by strong winds, expand to threaten homes and property along the wildland-urban interface at the edges of the developed areas of Benton County. The following describes historical wildfire events in the region, and presents an overview of the characteristics of a wildfire hazard.

#### **Historical Wildfire Events**

On Wednesday morning, October 16, 1991, winds gusting to 62 mph uprooted trees and downed power lines in the Spokane area. The energized power lines ignited dry grass and brush, creating 92 fires. The fires burned for six days, and resulted in the loss of one person and 114 homes. The multiple fires became collectively known as the Spokane Firestorm.

The Spokane Firestorm led to the creation of the Washington State Fire Services Resource Mobilization Plan. A State Fire Protection Policy Board was formed with representatives from nine regions (Benton County is within Region 8). The Board, through the State Fire Defense Committee, established the Mobilization Plan. The Mobilization Plan directs the mobilization of firefighting resources and aid to agencies overextended by fire disasters – typically from large fires exceeding the capacity of local agencies. Since the creation of the Mobilization Plan, state fire resources have been mobilized to aid Benton County agencies in controlling large wildfires on at least ten occasions, including:

<b><u>Incident Name</u></b>	<b><u>Date</u></b>
Silver Dollar	07/21/1994
Triple Vista	08/15/1994
Red Mountain/Appaloosa	07/30/1996
Cold Creek	08/16/1996
Benton City	07/21/1997
Olympia Command	08/26/1997
View Point	07/07/1998
Miller Ranch	07/09/1999
24 Command	06/28/2000
Mule Dry	08/24/2000

The 24 Command Fire posed a particularly serious hazard. On June 27, 2000, a vehicle accident ignited a wildfire along Highway 240 north of Richland. Abetted by moderate winds, the wildfire burned out of control for three days across private grazing lands and public lands, including an ecological reserve and the Department of Energy's Hanford Site. The fire burned over 192,000 acres. The fast-moving fire reached the outskirts of Benton City, burning over 25 homes and structures. Over 7,000 people were asked to evacuate from Benton City and West Richland. The Hanford Site declared an "Alert-Level Emergency" as the fire neared the 200-West Area, raising fears of a release of radiological contamination (monitoring for radiation during and after the fire did not show increased levels of radiation). In addition to the loss of private property in Benton

City, there was significant damage to the ecological reserve. Later that summer, the Mule Dry fire consumed 76,800 acres and threatened some of the areas south and west of Prosser.

In the 2001 Fire in Washington Annual Report (Washington State Patrol, Office of Fire Marshal), Region 8 reported 13,031 response incidents; of these, 9,377 (72 percent) were reported by Benton County. Not all agencies provided complete reports; therefore, actual totals could be higher. Of the overall total, about 10 percent of the incidents were fire, with an estimated loss of almost \$11 million (including structure fires). One train trestle fire was reported with property losses of \$1 million. Reporting shows 33 percent of the reported fires were natural vegetation, and an additional 11 percent of the reported fires were outside rubbish. Benton County experienced approximately 278 natural vegetation fires (e.g. wildfires) in 2001.

In the 2002 Fire in Washington Annual Report (Washington State Patrol, Office of Fire Marshal), Region 8 reported 18,190 response incidents; of these, 13,887 (76 percent) were reported by Benton County. Not all agencies provided complete reports; therefore, actual totals could be higher. Of the reported incidents, 11 percent are identified as fire, with damages estimated at \$6.6 million (including structure fires). Reporting shows 28 percent of the fires were natural vegetation, and an additional 14 percent were outside rubbish. Benton County experienced approximately 428 natural vegetation fires (e.g. wildfires) in 2002.

Wildfire continues to pose a serious hazard for Benton County residents. A wildfire ignited on October 12, 2003, in Coyote Canyon, behind Clodfelter Road at the south side of Kennewick. Pushed by winds up to 41 mph, the fire quickly burned 2,000 acres of undeveloped land. The fire forced the closing of I-82 for several hours, and led to the evacuation of several Kennewick homes below the hill south of 20<sup>th</sup> Avenue between Columbia Center Boulevard and Kellogg Street. No structures were damaged.

### **Wildfire Characteristics**

Wildfire is generally considered to be an intrinsic ecological process in nearly all central and eastern Washington ecosystems. The fire season in Washington typically runs from mid-May through October, although dry periods can extend the season further into the fall. The possibility of a wildfire occurring depends on fuel availability, topography, and weather, as well as human activities, including development patterns. According to the Washington State Wildland Fire Hazard Identification and Vulnerability Assessment (Emergency Management Division), wildland fires start most often in lawns and fields, or open areas, transportation areas, and wooded wildland areas. Wildfires responded to by city and county fire departments are largely ascribed to human causes, including cigarettes, fireworks, and outdoor burning. The largest dollar loss is associated with fires ignited from heat, spark, ember, or flames, followed by debris burning and cigarettes. Loss per incident for debris fires is cited as being three times higher than other fire causes.

Although wildfires can affect natural habitat and water quality and damage crops, including orchards and vineyards, the primary concern from a wildfire is the possible loss or damage of a structure, whether a residence or business facility. (Structures do not include small improvements such as fences). Areas where wildland abuts urban or residential development - known collectively as the interface - are the primary hazard areas for wildfire. There are three categories of interface community:

1. **Interface Community** – The Interface Community exists where structures directly abut wildland fuels. The National Fire Protection Association (NFPA) defines the interface as “an area where development and wildland fuels meet at a well-defined boundary” (NFPA 299, *Standard for Protection of Life and Property from Wildfire*, 1991). Development density for an interface community is usually three or more structures per acre.
2. **Intermix Community** – The Intermix Community exists where structures are scattered throughout a wildland area. NFPA 299 defines this intermix as “an area where development and wildland fuels meet with no clearly defined boundary.” Wildland fuels are both outside of and within the developed area. Development densities may range from structures placed close together to one structure per 40 acres.
3. **Occluded Community** – The Occluded Community usually occurs within a city or larger development, where structures abut an island of wildland type fuels (e.g., a park, greenway, or area left undeveloped due to topography). A clear line of demarcation exists. Development density is similar to the interface community or the surrounding city.

Certain conditions must be present for significant interface fires to occur. The most common conditions include: hot, dry, and windy weather; the inability of fire protection forces to contain or suppress the fire; the occurrence of multiple fires that overwhelm committed resources; and a large fuel load (dense vegetation). Once a fire has started, several conditions influence its behavior, including fuel, topography, weather, and human activity, including development.

### **Fuel**

Fuel is the material that feeds a fire, and is a key factor in wildfire behavior. Vegetative fuel consists of the combustible plants available to the fire that will contribute to the intensity and rate of spread of the fire. The U.S. Forest Service established the National Fire Danger Rating System in 1978. The system classifies fuels into three broad categories (light, medium, heavy) that in turn break down into a number of fuel models. Light fuels are grasses, forbs, sawgrasses and tundra. Medium fuels are light brush and small trees. Heavy fuels are dense brush, timber, and hardwoods. A fourth category of fuels, slash, is composed of timber harvesting residue and is not applicable in Benton County.

Wildfires in Benton County typically burn in natural vegetation consisting of brush and bunch grasses, including sage (*Artemisia* sp.), Russian olive (*Elaeagnus angustifolia*) tumbleweeds (*Salsola kali*), and annual and perennial grasses and forbs. In the summer and fall, these plants are typically dry and can fuel explosive fast-moving fires.

Much of the natural cover in the County is a mixture of Fuel Models A and T, considered “light” fuels. Some areas of the Yakima River floodplain and other brushy canyons and swales are predominantly Fuel Model B, a “heavy” fuel. These fuel models are defined by the U.S. Forest Service as:

**Fuel Model A.** This fuel model represents western grasslands vegetated by annual grasses and forbs. Brush or trees may be present but are very sparse, occupying less than a third of the area. Examples of types where Fuel Model A should be used are cheatgrass and medusahead. Open pinyon-juniper, sagebrush-grass, and desert shrub associations may appropriately be assigned this fuel model if the woody plants meet the density criteria. The quantity and continuity of the ground fuels vary greatly with rainfall from year to year.

**Fuel Model T.** The bothersome sagebrush-grass types of the Great Basin and the Intermountain West are characteristic of T fuels. The shrubs burn easily and are not dense enough to shade out grass and other herbaceous plants. The shrubs must occupy at least one-third of the site. Fuel Model T might be used for immature scrub oak and desert shrub associations in the West, and the scrub oak-wire grass type in the Southeast.

**Fuel Model B.** Mature, dense fields of brush 6 feet or more in height are represented by this fuel model. One-fourth or more of the aerial fuel in such stands is dead. Foliage burns readily. Model B fuels are potentially very dangerous, fostering intense fast-spreading fires.

Type, size, density, and moisture content of the fuels will determine the likelihood of fire spread through the interface, the intensity of the fire, and the rate of spread. The provision of defensible space and the elimination of ladder fuels are controllable elements of the fuel component. Plantings post-construction as part of the owners landscaping efforts often contribute to the fire potential into and from structures.

### **Topography**

Topography influences the movement of air, thereby directing a fire's course. For example, if the percentage of uphill slope doubles, the rate of spread in wildfire will likely double. Gulches and canyons can funnel air and act as chimneys, which intensify fire behavior and cause the fire to spread faster. Solar heating of dry, south-facing slopes produces upslope drafts that can complicate fire behavior. Unfortunately, hillsides with hazardous topographic characteristics are also desirable residential areas in many communities. This underscores the need for wildfire hazard mitigation and increased education and outreach to homeowners living in interface areas.

### **Weather**

Weather patterns combined with certain geographic locations can create a favorable climate for wildfire activity. Areas, such as Benton County, where mean annual precipitation is 5 to 10 inches per year (with 10 to 15 inches in discrete areas of the Horse Heaven Hills) are extremely susceptible to fire. High-risk areas in Washington share a hot, dry season in late summer and early fall when high temperatures and low humidity favor fire activity. Predominant wind directions may guide a fire's path. Wind speed contributes greatly to the degree of hazard posed by a wildfire; strong winds directly increase the rate at which the fire expands.

Recent concerns about the effects of climate change, particularly drought, are contributing to concerns about wildfire vulnerability. The term *drought* is applied to a period in which an unusual scarcity of rain causes a serious hydrological imbalance. Unusually dry winters, or significantly less rainfall than normal, can lead to relatively drier conditions, and leave reservoirs and water tables lower. Drought leads to problems with irrigation, and may contribute to additional fires, or additional difficulties in fighting fires. However, most fuel types (not including grasses) require two or three years of drought before the fuel becomes dangerously dry.

### **Human Activity**

One challenge Benton County faces regarding the wildfire hazard is from the increasing number of houses being built on the urban/rural fringe compared to 20 years ago. Benton County's population has expanded further and further into traditional wildlands. The "interface" between urban and suburban areas and the wildlands created by this expansion has produced a significant increase in threats to life and property from wildfires. Property owners in the interface are often unaware of the problems and threats they face. Therefore, many owners have done little to

manage or offset fire hazards or risks on their own property. Furthermore, human activities increase the incidence of fire ignition and potential damage.

### **Damage to Structures**

Wildfire damage to structures, typically residences, is one of the primary concerns associated with wildfire hazard. The crossover between a wildfire and a structural fire occurs when fires in wildland fuels get close enough to the structure to create ignition, either through heat from flames or firebrands (lofted burning embers). The crossover can also occur from the structure to the wildland vegetation, e.g. a structure fire in or adjacent to the interface causing the wildfire.

Recent research on wildland-urban fire indicates the potential for home ignitions during wildfires depends on a structure's fuel characteristics and the heat sources adjacent to the home (Cohen 1995; Cohen 2000; Cohen and Butler 1998). In Cohen's research, the home is considered as fuel. The heat to ignite the fuel (e.g. home) comes from burning materials adjacent to the home (natural vegetation, landscaping, wood piles, etc.) and firebrands on the home. How close flames are to the home and whether firebrands contact the home determines if the home receives sufficient heat to ignite. The area adjacent to the home determining home ignition potential is referred to as the home ignition zone, and includes the home and an area surrounding the home within 100 to 200 feet.

### **4.2.2 Wildfire Hazard Assessment**

The following presents an evaluation of the wildfire hazard in Benton County, including the determination of likelihood of occurrence, identification of areas of wildfire hazard, an evaluation of the vulnerability of communities to wildfire, and a summation of wildfire risk.

#### **Likelihood of Occurrence**

Based on consideration of the wildfire hazard characteristics and history in Benton County, the Planning Committee determined that there is a great likelihood that a major wildfire hazard event will occur within the five year planning cycle – e.g., the likelihood of occurrence is **high**. A major hazard event is one with serious potential adverse consequences for some important part of the population, property, infrastructure, or environment.

#### **Exposure Assessment**

Areas exposed to wildfires are those undeveloped areas with natural vegetation, including rangeland, natural areas, undeveloped hillsides, etc. Wildfire hazard areas are commonly identified in regions of the wildland-urban interface, and include Interface, Intermix, and Occluded communities. Figure 4.2-1 (at the rear of this chapter) shows broad categories of land use in Benton County. The land use illustrates the exposure to wildfires – the Hanford Site and areas considered for agricultural uses, open space and low density residential uses typically include expanses of natural vegetation and are more susceptible to wildfires. Where these land uses abut urban areas and higher density residential areas, the exposure to wildfire hazard increases. As can be seen from the land uses in Figure 4.2-1, a significant portion of Benton County is susceptible to wildfires.

The following areas are considered exposed to wildfire hazards:

- The developed areas immediately outside the Benton City boundaries.

- The southern and western fringes of Kennewick, as well as localized areas (occluded communities) next to brushy canyons and swales.
- The outermost edges of Prosser, including developed areas immediately outside the City boundaries.
- The southern, southwestern, and northwestern fringes of Richland, as well as localized areas (occluded communities) next to brushy canyons, swales, and the area along the Yakima River delta.
- The southern, southwestern, western, and northwestern sections of West Richland, as well as numerous localized areas (occluded communities) next to undeveloped parcels, brushy canyons, swales, and the area along the Yakima River delta.
- All of Benton County outside its cities, including in particular the urban growth areas around the cities and the fringes of the communities of Finley, Paterson, Plymouth, and Whitstran.

Fully developed areas within the cities and urban growth areas (excluding areas adjacent to naturally vegetated canyons, swales, and parks) are not considered exposed to wildfires.

### **Vulnerability Assessment**

Ranges of the wildfire hazard are further determined by the ease of fire ignition due to natural or human conditions and the difficulty of fire suppression. The wildfire hazard is also magnified by several factors related to fire suppression/control, such as the surrounding fuel load, weather, topography, and property characteristics. The National Fire Protection Association (NFPA) has developed a checklist for measuring wildfire risk (Standard 299). The elements of the checklist (shown in Table 4.2-1) along with the other information presented in this chapter were considered in developing the following qualitative determinations of vulnerability.

The hills and canyons surrounding the urban centers of Kennewick, Richland, West Richland, Benton City, and Prosser include interface, intermix, and occluded communities. In addition, the developed unincorporated areas of Finley, Paterson, and Plymouth contain primarily intermix areas. Occluded interface areas occur largely in West Richland, and to a lesser extent in Kennewick and Richland. The development of homes and other structures is encroaching onto adjacent agricultural and natural areas and is continually expanding the wildland-urban interface.

There are large areas of Benton County that are subject to wildfire. All of the municipalities are exposed to wildfire at their wildland-urban interfaces. The risk from wildfire is **high** in the interface and intermix communities at the growing boundaries of the cities and urban areas and **medium** in the occluded communities within the cities and urban growth areas. The wildfire risk to the remainder of the exposed areas of the County is **medium**. In addition, drought conditions and/or strong winds can raise the risk to **high** for all of Benton County.

<b>Table 4.2-1 NFPA Standard 299 Checklist for Measuring Wildfire Risk</b>	
<b>ELEMENT</b>	<b>POINTS</b>
<b>A. Subdivision design</b>	
1. Ingress and egress	
Two or more, primary roads	1
One road, primary route	3
One way in/out	5
2. Primary road width	
Minimum of 20 feet	1
Less than 20 feet	3
3. Road accessibility	
Smooth road, grade < 5 percent	1
Rough road, grade > 5 percent	3
Other	5
4. Secondary road terminus	
Loop roads, cul-de-sacs	
Outside radius > 50 feet	1
Outside radius < 50 feet	3
Cul-de-sac turnaround	
Dead-end roads < 200 feet	3
Dead-end roads > 200 feet	5
5. Average lot size	
More than 10 acres	1
Between 1 – 10 acres	3
Less than 1 acre	5
6. Street Signs	
Present	1
Not present	5
<b>B. Vegetation (Fuel Models)</b>	
1. NFDRS fuel models	
Light (Fuel Models A, C, L, N, S and T)	1
Medium (Fuel Models D, E, F, H, P, Q and U)	5
Heavy (Fuel Models B, G, and O)	10
Slash (Fuel Models J, K and L)	10
2. Defensible space	
More than 100 feet of treatment from buildings	1
30 – 70 feet of treatment from buildings	5
No defensible space treatment	10
<b>C. Topography</b>	
1. Slope	
Less than 9 percent	1
Between 10 – 20 percent	4
Between 21 – 30 percent	7
Between 31 – 40 percent	8
Greater than 41 percent	10
<b>D. Additional Rating Factors</b>	

1. Rough topography that contains steep canyons	2
2. Areas with a history of higher fire occurrence than surrounding areas due to special situations such as heavy lightening, railroads, escaped debris burning, arson, etc.	3
3. Areas that are periodically exposed to unusually severe fire weather and strong dry winds.	4
E. Roofing Material	
1. Construction material	
Class A Roof	1
Class B Roof	3
Class C Roof	5
Non-rated	10
F. Existing Building Construction	
1. Materials (predominate)	
Noncombustible sliding/deck	1
Noncombustible sliding/wood deck	5
Combustible siding and deck	10
G. Available Fire Protection	
1. Water source availability (on site)	
500 gallons per minute hydrants < 1000 feet apart	1
Hydrants above or draft site	2
No hydrants or draft site available	3
2. Water source availability (off site)	
Sources within 20 minutes round-trip	1
Sources within 21 – 45 minutes round-trip	5
Sources > 46 minutes round-trip	10
H. Utilities (Gas and electric)	
1. Placement	
All underground utilities	1
One underground, one aboveground	3
All aboveground	5

For reference, the NFPA checklist totals the points for each item and assigns a wildfire risk as extreme hazard = 100 points; high hazard = 83 points; moderate hazard = 68 points; and low hazard = 49 points.

### 4.2.3 Community Wildfire Issues

#### Current Conditions

People moving from more urban areas frequently have high expectations for fire protection services. Often, new residents do not realize that they are living outside of a fire protection district, or that the services provided are not the same as in an urban area. The diversity and amount of equipment, as well as the number of personnel can be substantially limited in rural areas. Fire protection may rely more on the landowner's personal initiative to take measures to protect his or her own property. Therefore, public education and awareness may play a greater role in rural or interface areas.



However, great improvements in fire protection techniques are being made to accommodate for large, rapidly spreading fires that threaten large numbers of homes in interface areas. Growth and development in rural areas of Benton County influence the wild land/urban interface. While historical losses from wildfires in the County have been relatively low, the County shares some of the same characteristics of urban fringe development as areas ravaged by wildfire in California and the Southwest.

### **Ongoing Mitigation Activities**

Existing mitigation activities include current mitigation programs and activities that are being implemented by local, regional, state, or federal agencies or organizations.

#### **Local Programs**

The Cities of Kennewick and Richland maintain municipal fire departments. Most of the remainder of Benton County residents are served by six local fire districts. However, there are some parts of Benton County that have chosen not to participate in the fire districts. These areas have no local fire protection. The two City fire departments and six local fire districts maintain mutual aid agreements, both within Benton County and with fire districts in neighboring counties. State and Federal agency fire protection services are available on state and federal lands. State and Federal agencies also support local fire response efforts through the auspices of the State Mobilization Plan.

Long-range fire protection needs will require increases in equipment and manpower to maintain an effective level of protection. As Benton County continues to experience outward growth from its urban areas, there will be an increased level of service required by residents. This will likely result in a demand for increased full-time personnel as opposed to volunteer service in some of the County's fire protection organizations.

An additional factor is the integration of fire protection needs with long-range water needs. The source, storage capacity, and distribution infrastructure of water systems, as well as fire hydrant placement in higher-density urban developments and interface communities, must be adequate to provide sufficient volume and pressure for fire fighting needs.

The fire departments and districts provide essential public services in the communities they serve, and their duties far surpass extinguishing fires. In fact, many of the districts and departments provide other services to their jurisdictions, including Emergency Medical Technicians (EMT) and paramedics who can begin treatment and stabilize sick and injured patients before an ambulance arrives. All of the fire service providers in the County are dedicated to fire prevention, and use their resources to educate the public to reduce the threat of the fire hazard, especially in the wild land/urban interface. Fire prevention professionals throughout the County have taken the lead in providing many useful and educational services to residents, such as:

- Home fire safety inspection;
- Assistance developing home fire escape plans;
- Business Inspections;
- Woodstove installation inspections;
- Free smoke detectors to district residents who qualify;
- Fire extinguisher operation classes;
- Citizen Emergency Response Team training;
- School, church, and civic group fire safety education presentations;

- Fire cause determination;
- Counseling for juvenile fire-setters;
- Teaching fire prevention in schools;
- Conducting CPR classes;
- Teaching proper use of fire extinguishers;
- Coordinating educational programs with other agencies, hospitals, and schools; and
- Answering citizens' questions regarding fire hazards.

### **County/City Codes**

Local zoning development ordinances detail the setback, coverage, depth, and structure height requirements to provide fire safety and protection of all structures. In addition, section 510 in the Unified Building Codes documents further fire resistant standards in regard to roofing. Municipal building inspectors are responsible for enforcing these criteria in single-family residential structures. Fire districts work with the appropriate County and/or City building department to ensure safety in commercial structures.

### **State Programs**

EMD provides mitigation for wildfire hazards through the Hazard Mitigation Grant Program. Grant funds are made available on a competitive basis to communities with specific needs identified through the community Hazard Mitigation Plan.

Washington State Department of Natural Resources (DNR) provides three programs to mitigate wildfires. The Federal Excess Property Program loans used federal fire equipment to eligible Washington Fire Protection Districts. A similar State excess property program loans excess state fire equipment to local agencies. The Washington Wildland Fire Assistance Grant Program is open to all fire districts/departments serving communities less than 10,000 residents and who currently provide a wildland fire response to private, state, or federal ownership.

### **Federal Programs**

The proposed role of the federal land managing agencies in the wildland /urban interface is reducing fuel hazards on the lands they administer; cooperating in prevention and education programs; providing technical and financial assistance; and developing agreements, partnerships, and relationships with property owners, local protection agencies, states, and other stakeholders in wildland/urban interface areas. These relationships focus on activities before a fire occurs, which render structures and communities safer and better able to survive a fire occurrence.

The Federal Government has few mechanisms to encourage incentives to resolve the problems in rural, unincorporated areas. There are two programs delivered through the US Forest Service to assist in meeting the needs of rural areas: the Rural Fire Prevention and Control (RFPC) and Rural Community Fire Protection (RCFP). These programs provide cost-share grants to rural fire districts. The annual federal share of these programs has remained relatively stable, totaling approximately \$16 million and \$3 million, respectively. Renewed focus of these programs, emphasizing local solutions, is encouraged.

### **Federal Emergency Management Agency (FEMA) Programs**

FEMA is directly responsible for providing fire suppression assistance grants and, in certain cases, major disaster assistance and hazard mitigation grants in response to fires. The role of FEMA in the wildland /urban interface is to encourage comprehensive disaster preparedness plans and programs, increase the capability of state and local governments, and provide for a greater understanding of FEMA's programs at the federal, state, and local levels.

### **Fire Suppression Assistance Grants**

Fire Suppression Assistance Grants may be provided to a state with an approved hazard mitigation plan for the suppression of a forest or grassland fire that threatens to become a major disaster on public or private lands. These grants are provided to protect life and improved property, and encourage the development and implementation of viable multi-hazard mitigation measures, and provide training to clarify FEMA's programs. The grant may include funds for equipment, supplies, and personnel. A Fire Suppression Assistance Grant is the form of assistance most often provided by FEMA to a state for a fire. The grants are cost-shared with states. FEMA's US Fire Administration (USFA) provides public education materials addressing wildland/urban interface issues, and the USFA's National Fire Academy provides training programs.

### **National Wildland/Urban Interface Fire Protection Program**

Federal agencies can use the National Wildland/Urban Interface Fire Protection Program to focus on wildland/urban interface fire protection issues and actions. The Western Governors' Association (WGA) can act as a catalyst to involve state agencies, as well as local and private stakeholders, with the objective of developing an implementation plan to achieve a uniform, integrated national approach to hazard and risk assessment and fire prevention and protection in the wildland/urban interface. The program helps states develop viable and comprehensive wildland fire mitigation plans and performance-based partnerships.

*Firewise* is a program developed within the National Wildland/ Urban Interface Fire Protection Program, and it is the primary federal program addressing interface fire. It is administered through the National Wildfire Coordinating Group whose extensive list of participants includes a wide range of federal agencies. The program is intended to empower planners and decision makers at the local level. Through conferences and information dissemination, Firewise increases support for interface wildfire mitigation by educating professionals and the general public about hazard evaluation and policy implementation techniques. Firewise offers online wildfire protection information and checklists, as well as listings of other publications, videos, and conferences. The interactive home page allows users to ask fire protection experts questions, and to register for new information as it becomes available.

### **U.S. Forest Service**

The U.S. Forest Service (USFS) is involved in a fuel-loading program implemented to assess fuels and reduce hazardous buildup on US forestlands. The USFS is a cooperating agency and, while it has little to no jurisdiction in the lower valleys, it has an interest in preventing fires in the interface, as fires often burn up the hills and into the higher elevation US forestlands.

### **Other Mitigation Programs and Activities**

Some areas of the country are facing wildland/urban issues collaboratively. These are model programs that include local solutions. Summit City, Colorado, has developed a hazard and risk assessment process that mitigates hazards through zoning requirements. In California, the Los Angeles City Fire Department has retrofitted more than 100 fire engines with fire retardant foam capability, and Orange City is evaluating a pilot insurance grading and rating schedule specific to the wildland/urban interface. All are examples of successful programs that demonstrate the value of pre-suppression and prevention efforts when combined with property owner support to mitigate hazards within the wildland/urban interface.

#### **4.2.4 Wildfire Mitigation Strategy**

The following are potential measures to mitigate the hazard posed by wildfires. The list is not definitive – there may be other potential mitigation actions. The potential mitigation measures listed below are not recommended action items for the municipalities of Benton County. Rather, they are included here as examples of the types of mitigation measures other cities and counties have used or considered for similar hazards. The potential mitigation measures have been categorized by the type of mitigation response they represent. Although there are many precautions that can be taken to limit the likelihood of wildfires, it is not feasible to hope to eliminate a naturally occurring hazard. Therefore, mitigation response must focus on limiting the exposure of people and property to the hazard, and limiting the vulnerability of property to the hazard. Types of mitigation response typically include:

##### *Limiting Exposure*

- Removing existing development within the area of hazard.
- Restricting future development within the area of hazard.

##### *Limiting Vulnerability*

- Providing structural defenses against the impacts of the hazard.
- Providing nonstructural defenses against the impacts of the hazard.
- Providing hazard mitigation education to affected communities and the general public.
- Ensuring that plans, procedures, facilities, equipment, and trained personnel are available to provide for adequate hazard response and recovery.

##### ***Removing Existing Development Within the Area of Hazard***

Given the nature of the wildfire hazard, e.g., residential areas expanding into relatively untouched rangelands or undeveloped lands becoming increasingly threatened by wildfires, there is no set area of hazard. Instead, the hazard area - assuming growth of the community – is continually expanding outward. This makes removal of existing development difficult to implement. Potential mitigation actions include:

1. Developing an acquisition or “buy-out” program to purchase property subject to repetitive wildfire damage. The buyout program would consist of the City/County purchasing subject properties using a combination of city funds and grant money; removing structures, etc. subject to damage from wildfires, and restoring the site to provide a natural fire buffer and to preserve open space.
2. Removing and relocating critical facilities or system components to a wildfire safe area, e.g., an area outside of the urban/rangeland interface.

##### ***Restricting Future Development Within the Area of Hazard***

3. Restricting development within the urban/wildland interface, particularly incremental development, through available land use planning and zoning requirements.

##### ***Providing Structural Defenses Against the Impacts of the Hazard***

4. Replace existing flammable roofing materials with fire-resistant materials (e.g. replace wood shakes and asphalt shingles with slate, terra cotta or other types of tile, or standing

- seam metal roofing). FEMA estimates that having a contractor replace a roof costs approximately four dollars per square foot of roof area for tile or metal roofing and about seven dollars per square foot of roof area for slate. A fire-resistant sub-roof adds further protection.
5. Using fire-resistant building materials when building, renovating, or retrofitting structures. Such materials include tile, stucco, metal siding, brick, concrete block, rock, or other fire-resistant materials.
  6. Avoiding wood siding or vinyl siding on structure exposed to wildfire.
  7. Replacing large windows with smaller windows. Use only thick tempered safety glass in large windows and sliding glass doors. Double pane glass and tempered glass are more resistant than single pane glass. Plastic skylights can melt.
  8. Treating wood siding, cedar shakes, exterior wood paneling, and other highly combustible materials with fire retardant chemicals.
  9. Installing non-flammable shutters on windows and skylights.
  10. Screening exterior attic and underfloor vents with wire screening no larger than 1/8 inch mesh. Box in eaves (leaving adequate ventilation).
  11. Using fire-resistant building materials when building, renovating, or retrofitting structures attached to the house, such as decks, porches, fences, and outbuildings. Use masonry or metal as a protective barrier between a fence and structure. Use metal when constructing a trellis and cover it with high-moisture, low flammability vegetation. Screen or box-in areas underneath patio decks or elevated porches with wire screen. Replace wooden decks with stone, brick, or concrete terraces or patios; where wooden decks are used, do not locate decks at the top of a slope. Treat wooden decks with fire-retardant chemicals.

***Providing Nonstructural Defenses Against the Impacts of the Hazard***

12. Managing landscape vegetation such that fire cannot be carried from the vegetation to the structure. Ensure that vegetation, yard debris and other combustible materials are not in proximity to the structure (e.g., clear the area around the structure). Shrubs, brush, woodpiles, and combustible debris should be removed within a radius of 30 feet from the structure. Trees should be at least ten feet from the structure, or ideally, a distance greater than the height of the mature tree. Where trees are left standing, remove branches to a height of 15 feet. FEMA estimates that removal of large trees costs approximately \$300 to \$500; removing smaller trees and shrubs will cost less.
13. Keeping all combustible materials away from the structure. Remove all dead limbs, needles and debris from rain gutters. Outbuildings should be kept from the main structure a distance equal to their height. Firewood, picnic tables, boats, etc. should be stored away from the structure. Gasoline and other flammable materials should be stored in an approved safety can away from occupied structures.

14. Propane tanks and/or fuel oil tanks should be far enough away from buildings for valves to be shut off in case of fire. Keep area clear of combustible vegetation.
15. Designing community and individual lot layouts to mitigate wildfire damages, including:
  - a. Limiting development densities and/or requiring large lot sizes;
  - b. Transferring allowable densities to safer areas on- or off-site;
  - c. Requiring adequate minimum gravel or paved street widths;
  - d. Limiting street grades to ensure fire truck access;
  - e. Requiring at least two access points into each community;
  - f. Restricting the length of cul-de-sacs as well as the number of dwelling units on them;
  - g. Developing adequate water supply, maintaining adequate flow to fight fires, and providing redundant storage locations;
  - h. Using open space easements for fire breaks, equipment staging and evacuation areas;
  - i. Designing site layouts to provide “fuel breaks” (e.g., driveways, walkways, pools, patios, and lawns) to protect structures; and
  - j. Designing site layouts to mitigate fire potential, e.g. build on the most level portion of the lot, avoiding slopes; and set single-story structures back at least thirty feet from a ridge or cliff edge, increasing distance if structure is more than one story.
16. Encouraging implementation of wildfire mitigation activities in a manner consistent with the goals of promoting sustainable ecological management and community stability. Ideas for implementation include:
  - a. Employ mechanical thinning and prescribed burning to abate the risk of catastrophic fire and restore the more natural regime of high frequency, low-intensity burns. Prescribed burning can provide benefit to ecosystems by thinning hazardous vegetation and restoring ecological diversity to areas homogenized by invasive plants; and
  - b. Clear trimmings, trees, brush, and other debris completely from sites when performing routine maintenance and landscaping to reduce fire risk.
17. Encouraging property owners and developers to install and maintain buffer strips between wildlands and urban areas. Buffer strips could include irrigated vegetative strips, non-flammable ground covers, pavement, and bare soil.

***Providing Hazard Mitigation Education to Affected Communities and the General Public***

18. Developing/implementing outreach and education programs aimed at mitigating wildfire hazards and reducing or preventing the exposure of citizens, public agencies, private property owners, and businesses to natural hazards. Ideas for implementation include:
  - a. Encourage the hiring of fire prevention and education personnel to oversee education programs;
  - b. Visit urban interface neighborhoods and rural areas and conduct education and outreach activities;
  - c. Conduct specific community-based demonstration projects of fire prevention and mitigation in the urban interface;
  - d. Establish neighborhood “drive-through” activities that pinpoint site-specific mitigation activities. Fire crews can give property owners personal suggestions and assistance; and

- e. Perform public outreach and information activities at County fire stations by creating “Wildfire Awareness Week” activities. Fire stations can hold open houses and allow the public to visit, see the equipment and discuss wildfire mitigation with the station crews.
19. Providing property owners with information on emergency planning for wildfires, including:
- a. Removing combustible materials from around the house.
  - b. Closing all doors and windows.
  - c. Closing gas valves and shutting off pilot lights.
  - d. Turning on a light in each room for visibility in heavy smoke.
  - e. Placing valuables that will not be damaged by water in a pool or pond.
  - f. If hoses and adequate water are available, leave sprinklers on roofs and anything that might be damaged by fire.

***Ensuring that Plans, Procedures, Facilities, Equipment, and Trained Personnel are Available to Provide for Adequate Hazard Response and Recovery***

20. Enhancing emergency services to increase the efficiency of wildfire response and recovery activities. Ideas for implementation include:
- a. Install more fire reporting stations for better access and coverage;
  - b. Develop District call lists that includes all at-risk urban /wildland interface residents in the Districts jurisdiction in order to contact them during evacuations; and
  - c. Inventory bridges on evacuation routes, assess the bridges for their ability to support fire apparatus ingress, and encourage replacement of unstable bridges.
  - d. Inventory/map all potential water sources (e.g. irrigation canals, ponds, swimming pools, etc.) that could be used in case of wildfire.
21. Educating agency personnel on federal cost-share and grant programs, Fire Protection Agreements, and other related federal programs so the full array of assistance available to local agencies is understood. Ideas for implementation include:
- a. Investigate potential funding opportunities for individual mitigation projects; and
  - b. Develop, approve, and promote Fire Protection Agreements and partnerships to clarify roles and responsibilities and to provide for fire mitigation activities and suppression preparedness.
22. Inventorying alternative firefighting water sources and encouraging the development of additional sources. Ideas for implementation include:
- a. Advocate for water storage facilities with fire-resistant electrical pump systems in developments outside of fire protection districts that are not connected to a community water or hydrant system; and
  - b. Develop a protocol for fire jurisdictions and water districts to communicate all hydrant outages and water shortage information.
23. Encouraging development and dissemination of maps relating to the fire hazard to help educate and assist builders and homeowners in being engaged in wildfire mitigation activities, and to help guide emergency services during response. Ideas for implementation include:

- a. Develop/update wildland/urban interface maps using data derived from satellite-mapping;
  - b. Conduct risk analysis incorporating data and the created hazard maps using GIS technology to identify risk sites and further assist in prioritizing mitigation activities; and
  - c. Encourage coordination between fire jurisdictions and sanitary districts to make sure that the most accurate elevation maps are being used.
24. Increasing communication, coordination, and collaboration between wildland/urban interface property owners, local planners, and fire prevention crews and officials to address risks, existing mitigation measures, and federal assistance programs. Ideas for implementation include:
  - a. Encourage single-family residences to have fire plans and practice evacuation routes;
  - b. Encourage fire inspections in residential homes by fire departments to increase awareness among homeowners and potential fire responders;
  - c. Encourage a standard for the State Fire Marshal to evaluate fire plans and emergency plans;
  - d. Require fire department notification of new business applications to ensure that appropriate fire plans have been developed
25. Encouraging local zoning and planning agencies to work closely with landowners and/or developers who choose to build in the wildland/urban interface to identify and mitigate conditions that aggravate wildland/urban interface wildfire hazards, including:
  - a. Limited access for emergency equipment due to width and grade of roadways;
  - b. Inadequate water supplies and the spacing, consistency, and species of vegetation around structures;
  - c. Inadequate fuel breaks or lack of defensible space;
  - d. Highly flammable construction materials;
  - e. Building lots and subdivisions that are not in compliance with state and local land use and fire protection regulations; and
  - f. Inadequate entry/escape routes.
  - g. Encourage all new homes and major remodels involving roofs or additions that are located in the interface to have fire resistant roofs and residential sprinkler systems; and
  - h. Encourage the public to evaluate access routes to rural homes for fire-fighting vehicles and to develop passable routes if they do not exist.
26. Encouraging protection of critical facilities and/or other facilities or system components with high vulnerability to wildfire. Ideas for implementation include:
  - a. Conduct programs for removal of vegetative fuels on adjacent undeveloped land
  - b. Conduct programs to create vegetative fuels buffer zones for existing structures
  - c. Purchase wildland fire fighting apparatus for applicable jurisdiction's fire department
  - d. Develop alternative water supplies at or near the facility for wildfire suppression
  - e. Replace facility's existing landscaping with fire-safe landscaping
  - f. Purchase and install fire/smoke alarm and/or sprinkler systems
  - g. Provide for remotely alarmed fire/smoke detectors
  - h. Design and construct alternative evacuation/fire fighting access routes to facility
  - i. Retrofit structures in urban or urban interface zones for improved fire resistance
  - j. Retrofit structures for current fire code compliance



Ideas for implementation (non-structural initiatives ) include:

- k. Conduct a detailed assessment of fire risk for the facility or system component
- l. Prepare and implement fire safety educational programs for facility personnel
- m. Alter existing operational procedures to reduce fire risk
- n. Initiate and maintain a routine fire inspection and prevention program
- o. Develop plan for periodic vegetative fuels reduction on nearby undeveloped lands
- p. Ensure adequate/enhanced fire code enforcement at facility

#### **4.2.5 Wildfire Resource Directory**

##### **Local Resources**

Benton County fire protection districts include:

Fire Protection District 1  
144610 E. Law Lane  
Kennewick, WA 99338  
509.734.9100  
[bdfd1@3-cities.com](mailto:bdfd1@3-cities.com)

Fire Protection District 2  
P.O. Box 719  
Benton City, WA 99320  
509.588.3212  
[bcpd2@bcpd2.org](mailto:bcpd2@bcpd2.org)

Fire Protection District 3  
601 7<sup>th</sup> Street  
Prosser, WA 99350  
509.786-3873  
[chief301@bentonrea.com](mailto:chief301@bentonrea.com)

Fire Protection District 4  
P.O. Box 4248  
West Richland, WA 99353  
509.967.2945

Fire Protection District 5  
1112 Mead  
Prosser, WA 99350  
509.786.1723

Fire Protection District 6  
P.O. Box 218  
Paterson, WA 99345  
509.875.2029  
[fired6@bentonrea.com](mailto:fired6@bentonrea.com)

City fire departments include:

Kennewick Fire Department  
P.O. Box 6108  
Kennewick, WA 99336  
509.585.4231

Richland Fire Department  
1000 George Washington Way  
Richland, WA 99352  
509.942.7550

### **State Resources**

#### **Washington State Emergency Management Division**

The Emergency Management Division's focus is to work in partnership with federal, state, and local agencies, volunteers, and private organizations to reduce the potential effects of natural and man-made hazards affecting the State. Authority for Emergency Management Division (EMD) includes Chapters 38.52 and 38.54 Revised Code of Washington (RCW) and Title 118 Washington Administrative Code (WAC). EMD provides emergency mitigation planning, preparation, response, and recovery assistance. EMD operates the state's Emergency Operations Center, located on Camp Murray, near Tacoma. In addition, EMD manages the Washington State Fire Management Assistance Grant Program, and oversees implementation of the Mobilization Plan.

**Address:** P.O. Box 40955  
Olympia WA 98504-0955

**Phone:** (800) 562-6108

#### **Washington State Patrol, Fire Protection Bureau**

The Office of the State Fire Marshal, Fire Protection Bureau, provides services to fire districts, government agencies, members of the media, and the general public. These services include fire investigations; fire incident reporting and data collection; fire code review and adoption; construction plan review for fire sprinkler and alarm systems; and fire inspections of high risk occupancies housing elderly and vulnerable populations. In addition, the Bureau regulates the fireworks and sprinkler industry through a licensing program. The Bureau operates the State Fire Training Academy, which provides training to the state's fire departments and districts, and the Certification Program through a standards and accreditation process. They also provide coordination of Washington State fire service resources for mobilization during natural or human-caused disasters. Terrorism and hazardous materials training, fire and life safety prevention education, and public information services are also responsibilities of the Fire Protection Bureau.

<b>Address:</b> General Administrative Building	District 3
P.O. Box 42600	143302 East Law Lane
Olympia WA 98504-2600	Kennewick WA 99337-2011

<b>Phone:</b> (360) 753-6540	(509) 734-7029
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#### **Washington State Department of Natural Resources, Resource Protection Division**

The DNR is responsible for wildfire control on approximately 12 million acres of state and private lands. The Resource Protection Division has approximately 1,200 temporary and full time employees who fight wildfires, as well as providing fire prevention support. DNR administers the Washington Wildland Fire Assistance Grant Program, whereby funding is made available to qualified fire districts/departments serving communities less than 10,000 residents and who currently provide a wildland fire response to private, state, or federal ownership.

**Address:** Fire Prevention Program Coordinator  
WA Dept. of Natural Resources  
P.O. Box 47037  
Olympia, WA 98504-7037.  
**Phone:** (360) 902-1754 FAX: (360) 902-1757.  
**E-mail:** fire\_prevention@wadnr.gov

## **Federal Resources and Programs**

### **Federal Wildland Fire Policy, Wildland/Urban Interface Protection**

This is a report describing federal policy and interface fire. Areas of needed improvement are identified and addressed through recommended goals and actions.

**Website:** <http://www.fs.fed.us/land/wdfire7c.htm>

### **National Fire Protection Association (NFPA)**

This is the principal federal agency involved in the National Wildland/Urban Interface Fire Protection Initiative. NFPA has information on the Initiative's programs and documents. Other members of the initiative include: the National Association of State Foresters, the US Department of Agriculture Forest Service, the US Department of the Interior, and the United States Fire Administration.

**Contact:** Public Fire Protection Division

**Address:** 1 Battery March Park, P.O. Box 9101, Quincy, MA 02269-9101

**Phone:** (617) 770-3000

### **National Interagency Fire Center (NIFC)**

The NIFC in Boise, Idaho is the nation's support center for wildland firefighting. Seven federal agencies work together to coordinate and support wildland fire and disaster operations. These agencies include the Bureau of Indian Affairs, Bureau of Land Management, Forest Service, Fish and Wildlife Service, National Park Service, National Weather Service, and Office of Aircraft Services.

**Contact:** National Interagency Fire Center

**Address:** 3833 S. Development Avenue, Boise, ID 83705-5354

**Phone:** (208) 387-5512

**Website:** <http://www.nifc.gov/>

### **United States Fire Administration (USFA) of the Federal Emergency Management Agency (FEMA)**

As an entity of the Federal Emergency Management Agency, the mission of the USFA is to reduce life and economic losses due to fire and related emergencies through leadership, advocacy, coordination, and support.

**Contact:** USFA, Planning Branch, Mitigation Directorate

**Address:** 16825 S. Seton Ave., Emmitsburg, MD 21727

**Phone:** (301) 447-1000

**Website:** <http://www.fema.gov/mit/wfmit.htm> - Wildfire Mitigation Planning

<http://www.usfa.fema.gov/index.htm> - USFA Homepage

<http://www.usfa.fema.gov/wildfire/> - USFA Resources on Wildfire

### **Additional Resources**

**Firewise – The National Wildland/Urban Interface Fire program** Firewise maintains a Website designed for people who live in wildfire- prone areas, but it also can be of use to local planners and decision makers. The site offers online wildfire protection information and checklists, as well as listings of other publications, videos, and conferences.

**Contact:** Firewise

**E-mail:** [firewise@firewise.org](mailto:firewise@firewise.org)

**Website:** <http://www.firewise.org/>

### **Publications**

*National Fire Protection Association Standard 299: Protection of Life and Property from Wildfire.* National Wildland/Urban Interface Fire Protection Program, (1991). National Fire Protection Association, Washington, D.C. This document, developed by the NFPA Forest and Rural Fire Protection Committee, provides criteria for fire agencies, land use planners, architects, developers, and local governments to use in the development of areas that may be threatened by wildfire. To obtain this resource:

**Contact:** National Fire Protection Association Publications

**Phone:** (800) 344-3555

**Website:** <http://www.nfpa.org> or <http://www.firewise.org>

*An International Collection of Wildland-Urban Interface Resource Materials* (Information Report NOR-X-344). Hirsch, K., Pinedo, M., & Greenlee, J. (1996). Edmonton, Alberta: Canadian Forest Service.

This is a comprehensive bibliography of interface wildfire materials. Over 2,000 resources are included, grouped under the categories of general and technical reports, newspaper articles, and public education materials. The citation format allows the reader to obtain most items through a library or directly from the publisher. The bibliography is available in hard copy or diskette at no cost. It is also available in downloadable PDF form. To obtain this resource:

**Contact:** Canadian Forest Service, Northern Forestry Centre, I-Zone Series

**Phone:** (780) 435-7210

**Website:** <http://www.prefire.ucfpl.ucop.edu/uwibib.htm>

*Wildland/Urban Interface Fire Hazard Assessment Methodology.*

National Wildland/Urban Interface Fire Protection Program, (1998), NFPA, Washington, D.C. To obtain this resource:

**Contact:** Firewise (NFPA Public Fire Protection Division)

**Phone:** (617) 984-7486

**Website:** <http://www.firewise.org>

*Fire Protection in the Wildland/Urban Interface: Everyone's Responsibility.* National Wildland/Urban Interface Fire Protection Program. (1998). Washington, D.C.: Author. To obtain this resource:

**Contact:** Firewise (NFPA Public Fire Protection Division)

**Phone:** (617) 984-7486

**Website:** <http://www.firewise.org>

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NFPA 1991. *Standard for Protection of Life and Property from Wildfire*. National Fire Prevention Association. Standard 299. 1991.

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